



Walter Thron.















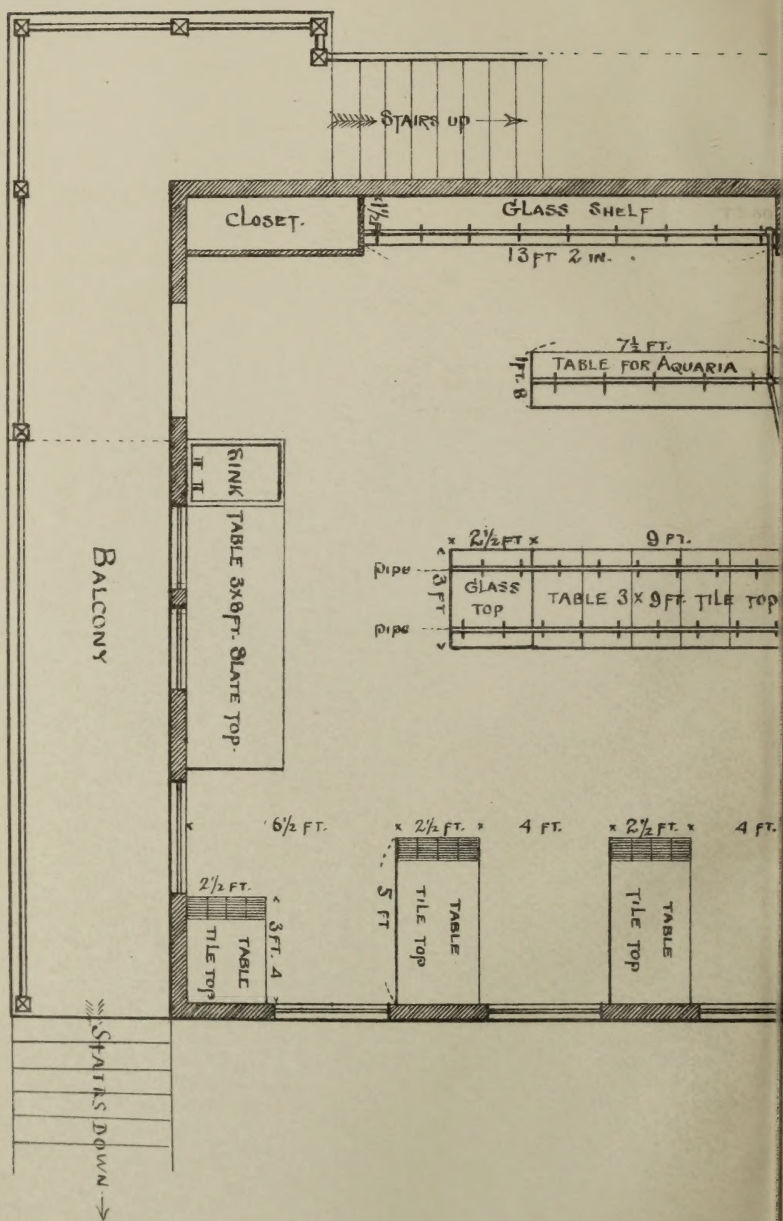




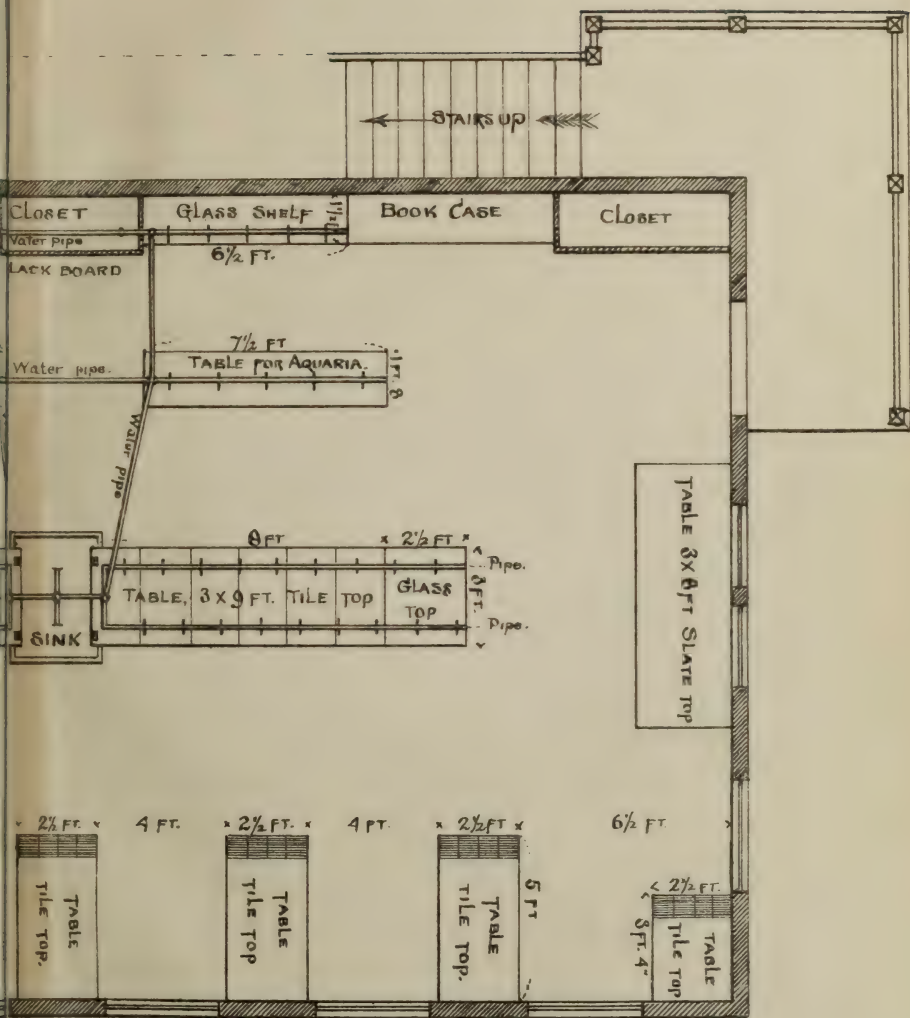


# PLAN OF ZOOLOGICAL LABORATORY AT NEWPORT, R.I.

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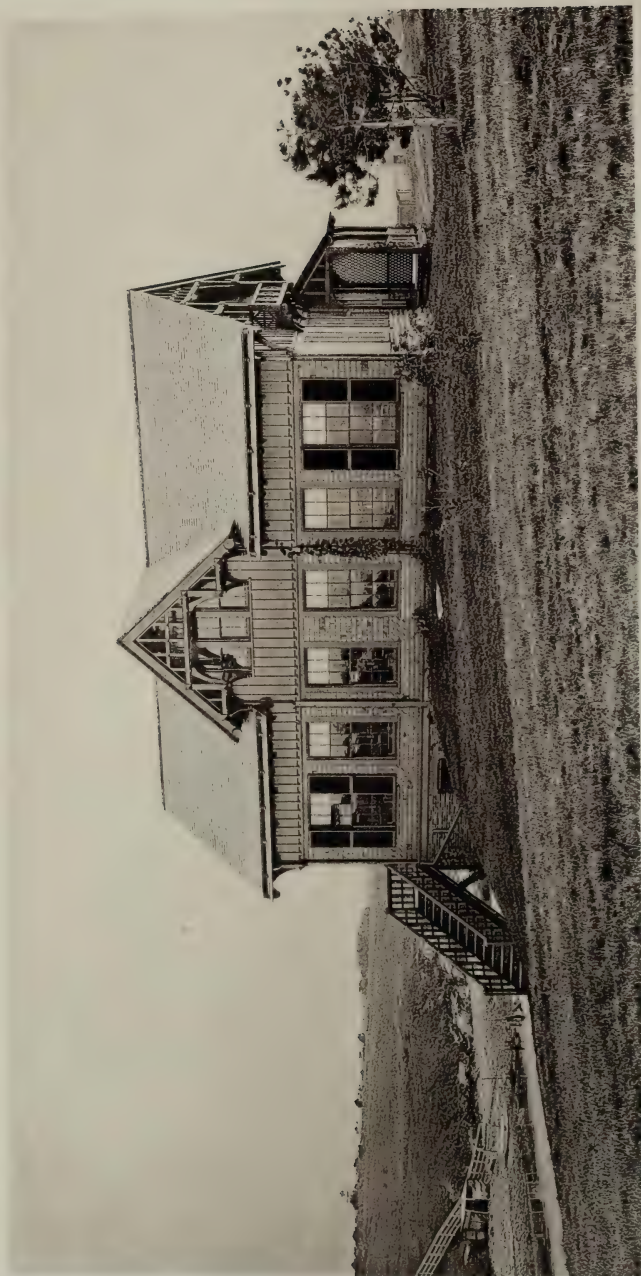












*Boston.*

ZOOLOGICAL LABORATORY,

NEWPORT, R. I.

*Heliotype Printing Co.*



ANNUAL REPORT  
OF  
THE CURATOR  
OF THE  
MUSEUM OF COMPARATIVE ZOÖLOGY  
AT HARVARD COLLEGE,  
TO THE  
PRESIDENT AND FELLOWS OF HARVARD COLLEGE,  
FOR  
1877-78.

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CAMBRIDGE:  
PRESS OF JOHN WILSON AND SON.

1878.  
J.





# REPORT.

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TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE:—

The Trustees of the Museum having, in accordance with the Acts of the Legislature (referred to in their last Report for 1876), transferred the property under their charge to the President and Fellows of Harvard College, the Legislature in January, 1877, passed an Act dissolving the Board of Trustees of the Museum (see Appendix A.); this is therefore the first Report I have the pleasure of presenting to the President and Fellows of Harvard College. The last Report submitted to the Trustees extended to the close of the year 1876. The present Report not only covers the year 1877, but the latter part of the academic year (1877-78), to September 1.

Only during the past eighteen months has the Museum enjoyed the income from the whole of the Agassiz Memorial Fund. The means thus placed at my disposal, in addition to assistance from other sources, has enabled me not only to push on the arrangement of the Museum very rapidly, but to lay up a building fund large enough to warrant a considerable addition to the present wing of the Museum building during the past summer. The Trustees of the Peabody Museum having decided that their building should form a part of the plan laid out by Professor Agassiz, it was made to harmonize as far as practicable with the existing wing of the Museum. A few changes, however, were suggested in the architecture of the roof and the proportions of the gallery windows, which changes have been carried out also in the new piece of the wing now in the course of erection; and it is hoped to modify the rest of the old building, so as to bring it into uniformity with the new work.

This requires only a change in the roof, substituting a fire-proof roof for the old one, and the cutting down the gallery windows. The latter has already been done, and the increase of light in the galleries is very marked, besides the improvement in the external appearance of the building.

This addition will allow for the complete arrangement and exhibition to the public of the zoölogical collections. Although the additional room gained on the floors not devoted to exhibition will enable us to do much preparatory work for the exhibition of the palæontological and geological collections, little can be placed on permanent exhibition in those departments until the rooms now occupied for the different courses of instruction given at the Museum are vacated. These rooms are all intended for exhibition rooms in the above departments, and their place is to be supplied eventually by fitting lecture-rooms and laboratories in the new addition to the Museum building. During the early years of the existence of the Museum, every thing had to be sacrificed to the exigencies of the collections, which accumulated at first far too rapidly for their proper arrangement. Little by little, however, the collections have been made available; and in 1876 it became possible to enter upon the definite arrangement planned by the founder of the Museum. This involved the removal of all the objects then on exhibition, and their complete rearrangement. Thanks, however, to the energy and zealous co-operation of the Assistants of the Museum, no less than five rooms have been thrown open to the public, after a period of chaos lasting for over a year, during which plasterers, painters, and carpenters carried on their work, without, however, closing the Museum to visitors. The rooms now permanently arranged are: 1st, the synthetic room, containing a synopsis of the animal kingdom (living and fossil); 2d, a room devoted to the systematic collection of the Radiates, Sponges, and Protozoa; 3d, the lower floor of a room devoted to the systematic collection of Birds; 4th, the lower floor of the large central room devoted to the systematic collection of Mammalia; 5th, the galleries of these two connecting rooms containing the systematic collections of Reptiles and Amphibians; and, lastly, a room containing a Faunal collection of North America, — the Birds and Mammals being on the main floor, the Fishes, Reptiles, and Invertebrates in

the gallery. I do not of course mean to say that these rooms are complete. They contain carefully chosen but sufficiently extensive selections from our collections in the different classes to give an excellent idea, for instance, of the classes of Mammals, Birds, or Reptiles (both living and fossil). These specimens are zoologically arranged, and include all that is likely to interest and instruct the public. The specialist, meanwhile, will find in the store-rooms and work-rooms all he needs for his studies, with facilities for doing his work unmolested at all times. The space now devoted to the different classes of the animal kingdom contains all that we can hope to give for public exhibition, and, indeed, all that is desirable to give, no matter how extensive the collections may become hereafter; limited collections well assorted and labelled being far more intelligible to the general visitor than larger and more indiscriminate ones. This plan enables us to place on exhibition picked specimens, and to make the contents of each room, little by little, as significant as possible. It shows us at once our blanks, and the resources of the Museum can be expended in filling them. This still leaves us in the present building three exhibition rooms not yet completed. One of these rooms is to be devoted to the systematic collection of Mollusca, a second room will contain the systematic collection of the Fishes on the main floor, and in the gallery of the same room will be placed the systematic collection of the Articulates. These two rooms I hardly hope to open to the public before two or three years are over. The third room will contain on the main floor the Faunal collection of South America, while the gallery will receive the Fauna of Australia. The two exhibition rooms to be added on the completion of the new part of the wing will be devoted to Europeo-Asiatic, Indian, and African Faunal collections. We shall thus have on one floor, when this arrangement is finished, a series of systematic collections of the various classes of the animal kingdom, each class being placed by itself, so that the visitor will see only one thing at a time, and will not be bewildered by room after room or case after case of specimens which to him seem to have no meaning. In the synoptic room, for instance, he will get an excellent idea of the great types of the animal kingdom. He will then pass to a room containing a special class, perhaps that of Birds. There he will find a systematic collection of the class, giving



him a broader view of the Birds, both living and fossil: he will not even there find every species, but such forms alone, with the necessary preparations in the way of skeletons, &c., as will give him a good general idea of the class of Birds. Should he wish to get some idea of the Avi fauna of North America, he will pass to the room containing the Faunal collection of that region, and there he will find the Birds characteristic of North America. When the other Faunal rooms are completed, he may pass from one room to another, and become successively acquainted with the characteristic Birds of Australia, Africa, India, &c. Of course, as far as possible, repetitions will be avoided in the faunal and systematic rooms, but this must of necessity be a work of time. This plan obviates the crowding together into one space of the whole collection of Birds, which, when arranged in the old way, merely satiates the visitor, and teaches him nothing. Of course, in such limited space (intentionally so restricted), only the characteristic groups of Birds can be placed on exhibition, and the rest of the collection is safely stored in drawers, where the skins are readily accessible and can be used for study. The intention is to carry on this plan for all the classes of the animal kingdom. There will remain unprovided for, as far as zoölogical collections are concerned, only the Marine Faunæ, it being impossible to connect them properly with any of the great terrestrial realms. It is therefore proposed hereafter to devote the main floor of two rooms, one to the Pacific Ocean, the other to the Atlantic Ocean, and to show in these the geographical distribution of marine animals, and as far as possible, by special collections, something also of the bathymetrical distribution. We hope eventually to carry out this double plan for the Palæontological Department, making one arrangement by Periods and another by Palæontological Series for the different classes. For the proposed location of the other collections, I will refer to the plans published with the Report of 1875.

The plan formerly proposed of labelling each room, so that the visitor should always know what he is looking at, has been carried out in all the rooms thus far opened to the public. Thus the visitor — on entering the Synoptic Room, for instance — finds the walls of the room labelled “Synoptic Collection of the Animal Kingdom.” He further finds each case labelled with

a general indication of its contents, and the contents clearly explained. On entering the room containing the systematic collection of Mammals, the visitor at once reads upon the walls that he is in the room containing the Systematic Collection of Vertebrates, the Class of Mammals. He will next find each case labelled with the name of the order, and frequently that of the suborder and even family. All this is done in each room with large, distinct letters, either on the walls or on the glass doors of the cases, arrows indicating the space to which the labels refer. Judging from the comments of the visitors who see this for the first time, the experiment has completely succeeded in its aim,—that of giving a clear and easily legible explanation of the collections thus far placed on exhibition.

For the past four or five years, no special attempt has been made to increase the collections. The force at the Museum has been occupied mainly in preparing our materials for exhibition, and rendering the collections easily accessible. Only the acquisitions demanded by our immediate wants have been made. The principal additions to our collections have therefore been among Birds and Mammals; a large number of skins and skeletons having been added to our faunal and systematic series. The additions to the Conchological and Entomological Departments have been mainly made through exchanges. The Loew collection of Diptera, purchased some time ago with the Gray Fund, has been received at the Museum; and to Baron Osten-Sacken the Museum owes a large addition in the same order. In the Herpetological Department, the principal collection received, in addition to an extensive series of exchanges, has been a number of skeletons purchased in Europe. By far the most important additions received for many years are the results of the dredgings which I made during the past winter in the Gulf of Mexico, in the United States Coast Survey steamer "Blake." These, added to the collections already in the Museum from the expeditions formerly in the charge of the late Professor Agassiz and of Count Pourtalès, probably give the Museum, after that made by the "Challenger," the richest deep-sea collection in existence.

It is now ten years since Dr. Hagen became connected with the Museum. During his administration of the Entomological Department, the collections have more than trebled in size;

and I may call attention to the biological collection, which owes its existence and present condition entirely to his care. It contains about three thousand species of all orders, and far surpasses any existing collection.

For the first time, the name of one of the most enthusiastic and distinguished of our Assistants does not head the annual report hitherto so carefully prepared by him. The death of Mr. Anthony, which occurred on October 16th, has brought to a close a long term of faithful service. Mr. Anthony became connected with the Museum in August, 1863, and from that time until his decease his time and energies were given to the department of Conchology, with such assiduous and entire devotion as is rarely equalled. He was a recognized authority on American Land and Fresh-water Mollusca; having shared pioneer work upon them with Say, Haldeman, Conrad, and Lea. His descriptions of species — more numerous than is generally known, since many of them antedate the recollection of younger conchologists — are to be found in the earlier volumes of most of our scientific journals. He had held correspondence and conducted exchanges with almost all active conchologists and shell-collectors of his time, who never failed to appreciate the remarkable skill in exchanging, the complete knowledge of the relative value of specimens, and the wide acquaintance with the traditions of Conchology, which were fruits of his long experience. He died at the age of seventy-three years, after a sickness of five weeks.

It is particularly gratifying to me to speak of the thorough co-operation now existing between the University and the Museum Library, and to recognize the cordial assistance given by Mr. Justin Winsor, the Librarian of Harvard College, to the Museum Librarian.

The publications of the Museum during the past eighteen months have been more numerous than during any previous corresponding time. The fourth volume of the Museum Bulletin, devoted to the Terrestrial Mollusca of the United States, by Mr. W. G. Binney, has been published, pp. 239, plates 100. The Museum is indebted to Mr. Binney for the large number of plates which accompany this volume. Mr. Binney has also presented to the Museum all his MS., as well as the copper-plates belonging to the Terrestrial Mollusks of North America,



by Amos Binney. The first six numbers of Vol. V. of the Bulletin, containing articles by Messrs. Agassiz, Faxon, Prime, and Benton, have been distributed.

To Mr. Temple Prime we owe the plates which accompany his paper on Corbiculidæ; and to the Hon. Carlile P. Patterson, Superintendent of the United States Coast Survey, the small map of the Hydrography of the Gulf of Mexico, which accompanies Bulletin No. 6.

In connection with Professor J. D. Whitney and the Geological Survey of California, the Museum has published No. 2 of Vol. VI. of the Memoirs on the Fossil Plants of the Auriferous Gravel Deposits of the Sierra Nevada, by Leo Lesquereux, pp. 58, 10 plates.

The Hydroids of the Gulf Stream, collected by Mr. Pourtalès under the auspices of the United States Coast Survey, have been fully worked up by Professor George J. Allman, of London, and published, with the permission of the Superintendent of the United States Coast Survey, by the Museum as Vol. V. No. 2 of its Memoirs, pp. 54, plates 34. Finally, I have myself issued, as one of the Museum Memoirs, the materials left by Professor Agassiz to form the fifth volume of the Contributions to the Natural History of the United States, pp. 136, 20 plates, as Vol. V. No. 1.

In addition to these publications, I could refer to papers of Baron Osten-Sacken, Mr. R. McLachlan, of Mr. Fauvel, of Baron Sélys Longchamp, who have availed themselves of Museum material placed at their disposal, besides those published by the Museum Assistants in other serials than those of the Museum. Dr. Steindachner has continued in the Proceedings of the Vienna Academy the descriptions of many new species of fishes collected by the Thayer Expedition.

Very gratifying returns are received at the Library in exchange for our publications, the societies with which we now exchange regularly having increased in number during the past year. It is, however, questionable how far the system of exchanges now generally carried on by scientific societies is remunerative.

As in former years, large collections have been sent to specialists for examination or for the preparation of special reports in expeditions undertaken with the supervision of the Museum.

These Reports are to be published either by the Museum or in connection with other publications. Collections of Crustacea have been sent to Professor Alph. Milne Edwards; of Annelids, to Professors Ehlers and Perrier; of Star Fishes, to Professor Perrier; of Cephalopods, to Professor Carus; of Sponges, to Professor Schmidt; Hydroids, to Mr. Clarke, of the Johns Hopkins University; Mollusca, to Mr. Dall, of the Smithsonian; and Crinoids, to Sir Wyville Thomson.

During the years 1862 to 1864, a number of collections were sent from the Museum to schools and colleges, not only in the State, but also throughout the country. From 1864 to 1876, collections have been sent at irregular intervals to complete, as far as possible, the series intended for instruction in our schools. Since 1876, the date of the last Report, an unusually large number of collections have been sent out, supplementing those previously sent to High Schools, Normal Schools, and Colleges in the State: to the eight State Normal Schools; to the Public Schools of Boston, through Miss Crocker; to Amherst and Williams Colleges; to the Peabody Academy at Salem; to the Boston Society of Natural History; to the Wellesley College; to the Springfield City Museum; to the Cambridge High School; to the Museum at Gloucester; to Mount Holyoke Seminary; to Maplewood Institute, Pittsfield. Similar collections have been sent outside of the State to Chicago, to Cornell University, to Salt Lake City, to Brown University, to the University of Michigan, to Hillsdale, to Buffalo, to Kentucky, to Oberlin College, to Marietta. As far as practicable, similar educational collections will always be cheerfully sent, when the time of our staff will allow.

The general instruction at the Museum has been in charge of Professors J. D. Whitney, Shaler, Dr. James, Professor Hamlin, Dr. Faxon, Dr. Mark, Mr. Wadsworth. Special students have also received facilities for work as well as guidance in the different Laboratories of the Assistants.

The Sturgis-Hooper Professor of Geology, Professor J. D. Whitney, has given twice a week throughout the year lectures in Economic Geology to special students, candidates for the degree of Ph.D., and to Seniors and Juniors. He also gave instruction in Physical Geography during the greater part of the year to Sophomores and Juniors. During the past year, Professor

Whitney has also made preparation for a thorough course in Lithology, and has engaged Mr. Wadsworth as his Assistant in that department. By Professor Whitney's care, a large number of rock sections have been made for the use of the students in Lithology: a part of his private lithological collection has been unpacked, and made available at the Museum, thus placing the lithological department on a very creditable footing. A beginning of a special geological library has also been made by Professor Whitney, which, though incomplete as yet, is probably the best in the country. The Corporation have appropriated the larger part of the expenses of bookcases for its reception. Professor Whitney, besides defraying the greater part of the expenses of publishing Vol. VI. Part 2 of the Memoirs, has also, in addition to other expenses, provided himself the needed Assistants for the instruction in his department; the funds at present at the disposal of the Geological Department not being sufficient to more than pay the salary of the Professor, a condition of things which, it is hoped, will not continue long in so important a department of the Museum.

Professor N. S. Shaler has given instruction in general geology during the past year to seventy undergraduates and four graduates, the work consisting of lectures and field-work. In Palæontology there were fourteen undergraduates and three graduates who received instruction by lectures and laboratory work. Professor Shaler has also continued his usual summer course in connection with the Geological Survey of Kentucky.

Dr. William James gave instruction during the past year in Comparative Anatomy and Physiology of Vertebrates to a number of undergraduates, varying from eighty to ninety. The course was similar to that given the previous year. The more practical and human parts of the subject seem to awaken the most general interest. Since the resignation of Professor McCrady, the instruction in zoölogy has been divided between Dr. Faxon and Dr. Mark; Dr. Faxon taking charge of the Radiates and Crustacea, Dr. Mark of the Mollusks and air-breathing Arthropods.

Aside from the work of instruction, Dr. Mark gave considerable time, especially in the first half of the year, to the collection of Vermes in the Museum. This collection has been



assorted and arranged according to orders. The bottles have all been thoroughly cleaned, and alcohol changed when necessary. The critical study and determination of specimens have only been begun. A small number of contributions from outside have been received. There have been sent from this collection 1. All the Lumbricidæ to M. Perrier; 2. All Vermes of the Hassler Expedition to Professor Ernst Ehlers, also those of the "Blake" Expedition.

During the winter of 1877 to 1878 from December to March, I was invited by the Superintendent of the United States Coast Survey to join the steamer "Blake," and carry on extensive dredging operations in deep water in the Straits of Florida, the Yucatan Channel, and in the Gulf of Mexico. A preliminary account of this first expedition will be found in Bulletins No. 1 and 6 of Vol. V., two letters addressed to the Superintendent of the Coast Survey on the results of the expedition, and the disposition made of the collections for publication. I may add that the "Blake" is fitting out for a new cruise to the West Indies, and that I shall again be allowed to join her, and continue the work so successfully commenced. Mr. Garman accompanied me in the "Blake." Although I have in my letters acknowledged my indebtedness to the officers of the "Blake," I cannot allow this opportunity to pass without reiterating my thanks for their interest in my work, and more specially to Captain C. D. Sigsbee, to whom so much of the success during our last cruise is due.

During the early part of 1877, I spent a couple of months at Edinburgh, at the invitation of Sir Wyville Thomson, who was kind enough to ask me to assist him in assorting the magnificent collections made by the "Challenger" for distribution among the different specialists who were to take charge of them. Sir Wyville Thomson generously proposed to allow two of the collections, the Echini and the Ophiuridæ, to come to this country; and these collections are now safely deposited in the Museum, where Mr. Lyman and myself are preparing the Reports on the Ophiuridæ and the Echini. Mr. Lyman is now printing a Preliminary Report on the Ophiuridæ, accompanied by ten plates. I have made fair progress with the text of the Echini, and thirty lithographic plates are nearly finished for the final Report.

To Messrs. Cabot, Lyman, and Pourtalès, the Museum is indebted for voluntary work and other valuable assistance. I have been relieved of much tedious detail by the Bursar of the College, Mr. Allen Danforth, who has taken charge of the Museum accounts since the transfer of the property from the Trustees to the President and Fellows of Harvard College.

Although summer instruction in Zoölogy has been abandoned at the Museum, I have been able in my new Laboratory at Newport to give facilities for work to half a dozen teachers (three ladies and three gentlemen); and it is my intention hereafter to divide the facilities at my command between students of the Museum and teachers of our common schools, who must, however, be sufficiently advanced to study for themselves with profit.

The new Laboratory erected by me at Newport is twenty-five feet by forty-five. The six windows for work are on the north side, and extend from the ceiling to within eighteen inches of the floor. In the spaces between the windows and the corners of the building are eight work-tables, three feet by five, covered with white tiles, one foot of the outer edge being covered, however, with black tiles for greater facility in detecting minute animals on a black background. Between the windows, movable brackets with glass shelves are placed; while similar brackets extend across the windows and between the tables, thus providing a shelf at any desired height. The tables for microscope work are three-legged stands of varying height, adapted to the different kinds of microscopes in use. The whole of the northern side of the floor upon which the work-tables and microscope-stands are placed is supported upon brick piers and arches independent of the main brick walls of the building, which form at the same time the basement of the building. The rest of the floor is supported entirely upon the outside walls and upon columns with stretchers extending under the crown of the arches reaching to the northern wall. This gives to the microscopic work the great advantage of complete isolation from all disturbance caused by walking over the floor. This will be duly appreciated by those who have worked in a building with a wooden floor, where every step caused a cessation of work, and was sure to disturb any object just at the most interest-

ing moment. The floor is cemented, and covered by a heavy oil-cloth. The centre of the large room is occupied by a sink, on each side of which extend two long tables, three feet by twelve. These are covered with different colored tiles, imitating mud, sand, gravel, sea-weed, black and white tiles, as well as red, yellow, blue, green, violet, to get all possible variety of background. A space at each end is covered by a glass plate, allowing the light to come from underneath, thus enabling the observer to examine larger specimens from the under side, without disturbing them when fully expanded. Two shorter and narrower tables, eighteen inches by seven feet, are placed half-way between these central tables and the southern face of the building. These tables are intended for larger aquaria or dishes, and are covered with common marble slabs. There is a blank wall on the south side, the whole of which is occupied by closets and shelves for storing glass jars, reagents, bottles, dishes, and so forth. A space is devoted to books. The open shelves for jars and dishes are of heavy rolled glass, supported upon iron brackets. The basement is used for the storage of alcoholic specimens, dredges, trawls, and other similar appliances. In the attic there is a large tank for salt water and another for fresh: the rest of the attic space will be eventually devoted to photographic rooms and room for an artist. The Laboratory is supplied with salt water by a small steam-pump driven by a vertical boiler of five-horse power: this is kept going the whole time day and night, the overflow of the tank being carried off by a large pipe. The water is taken some distance from the Laboratory, and drawn up at a horizontal distance of sixty feet from the shore in a depth of some four fathoms, the end of the suction pipe standing up vertically from the ground a height of five feet, and terminating in an elbow to prevent its becoming choked. The water is led through iron pipes coated inside with enamel. From the tank, the salt water is distributed in pipes extending in a double row over the central tables, over the long narrow tables for aquaria, and along the whole length of the glass shelves on the south wall. Large faucets to draw off salt water are placed at each sink; and by a proper arrangement of valves it is possible to lead fresh water to a part of the pipes, in case it is needed. The pipes leading over the tables and shelves are



provided with globe valves and nozzles, to which rubber pipe can be attached and the water led to a vessel below: there are fifty such taps, each of which can supply water or air to at least three or four jars. The overflow runs into gutters laid alongside the tables, leading into the main drain pipe. To aerate the salt water, I use an injector invented by Professor Richards of the Institute of Technology. This can be used to supply aerated water directly to the jar by providing it with a siphon overflow, or the aerated water can be collected in a receiver, from which air alone is then led to the jar. This latter course is the only practical one for delicate specimens, and for the bulk of the work of raising embryos. The east and west sides have large windows and doors provided with blinds; they always remain open, with the blinds closed to keep out sun-light, and serve to ventilate the Laboratory thoroughly. Large tables for dissection, covered with slate and adjoining a sink provided with fresh and salt water, are placed across the windows of these sides.

Ever since the closing of the school at Penikese, it has been my hope to replace, at least in a somewhat different direction, the work which might have been carried on there. It was impossible for me to establish a school on so large a scale; but I hope, by giving facilities each year to a few advanced students from the Museum and teachers in our public schools, to prepare, little by little, a small number of teachers, who will have had opportunities for pursuing their studies hitherto unattainable. The material to be obtained at Newport is abundant. The dredging is fair, and not difficult, as the depth in the immediate neighborhood does not exceed twenty to thirty fathoms. The pelagic fauna, however, is the most abundant. During the course of each summer, by the use of the dip-net, representatives of all the more interesting marine forms are sure to be found. With my small steam launch, a large space can always be traversed any evening, and advantage taken of the condition of the wind and tide, the launch being amply large for easy dredging in the moderate depths of the entrance of Narragansett Bay. The Laboratory is placed on a point at the entrance of Newport Harbor, past which sweeps the body of water brought by each tide into Narragansett Bay, and carrying with it every thing which the prevailing south-westerly winds drive before it.



Newport Island and the neighboring shores form the only rocky district in the long stretch of sandy beaches extending southward from Cape Cod,—an oasis, as it were, for the abundant development of marine life along its shores.

ALEXANDER AGASSIZ.

CAMBRIDGE, September, 1878.

## REPORT ON THE GEOLOGICAL DEPARTMENT.

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By J. D. WHITNEY, *Sturgis-Hooper Professor of Geology.*

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DURING the past year, instruction has been given at the Museum, by the Sturgis-Hooper Professor, in the department of Economical Geology ; on which subject there were lectures twice a week throughout the year. The class consisted of candidates for the degree of Ph.D., of special students, and of Seniors and Juniors from the undergraduate department. The Sturgis-Hooper Professor also gave or provided, during about six-sevenths of the year, instruction in Physical Geography, for Sophomores and Juniors, in the College "Natural History 1" elective. A part of the instruction in this elective was given by Mr. Wadsworth ; and this consisted of a short practical course in Determinative Mineralogy and Lithology, as a necessary introduction to a course of Physical Geography and Elementary Geology.

There being no facilities for practical instruction in Lithology in the University, and this being considered by the Sturgis-Hooper Professor as the foundation of all geological study, the necessary preparations were made by him for giving such instruction in future years. The services of Mr. M. E. Wadsworth were engaged for this purpose, and the requisite apparatus for making thin sections was purchased. There was also procured a suitable microscope, made in Berlin, on the pattern given by Rosenbusch. Mr. J. H. Huntington was engaged during nearly the whole year in making thin sections of a portion of the lithological collection belonging to the Sturgis-Hooper Professor ; and as much of this collection as room could be found for was unpacked and arranged in trays, and these placed in cases, with proper labels. All this was done under the direction of Mr. Wadsworth. The number of thin sections of specimens in the

collection prepared during the year is nearly one thousand. Besides these, a considerable number (about two hundred) have been imported from Europe for comparison. During the vacation just elapsed, Mr. Wadsworth spent several weeks at New York studying the collection and slides of the "Fortieth Parallel Survey," made for and under the direction of F. Zirkel. This department is now properly prepared for lithological instruction; and, the services of Mr. Wadsworth having been engaged exclusively for this work next year, several students have already applied for the enjoyment of the facilities thus provided, and will devote a considerable portion of their time to original lithological work.

In the way of publications, the geological department of the Museum has contributed to its *Memoirs* a work by Leo Lesquereux, describing the fossil flora of the Tertiary auriferous gravels of the Sierra Nevada, illustrated by ten double plates. This work forms Part 2 of Volume VI. of the *Memoirs*; and Part 1, which will complete the volume, is in press. The beginning of a special geological library is now being placed on the shelves in the rooms of the Sturgis-Hooper Professor; and, though incomplete, it is undoubtedly the best in this country.

With the co-operation of Professor Shaler, who instructs in geology in the undergraduate department of the College, and at the request of the Committee of the College Faculty having the subject of post-graduate instruction in charge, a scheme has been made out for a course of higher geological study at the Museum. For this purpose, it was necessary to some extent to combine the resources of the Museum and the College, and some of the students offering themselves for this course will undoubtedly be undergraduates; who can, however, avail themselves of the post-graduate studies only by special permission of the College Faculty, with the approval of the instructor specially interested, and whose course is desired to be taken. The scheme of post-graduate instruction, for the present, includes—

- I. Lithology.
- II. Dynamical Geology.
- III. Palæontology, Historical Geology.
- IV. Geological Field Work.
- V. Economical Geology.



The collections of the Museum in the Palæontological Department are ample for all purposes of ordinary instruction. For instruction in Lithology, we are for the present sufficiently well prepared. Books and maps for illustrating instruction in Dynamical and Field Geology are at hand in sufficient number and variety; but a considerable sum could be advantageously expended in procuring models in plaster, wood, and glass, for various illustrative purposes. Extensive collections in Economical Geology, and a large amount of room in which to display them, are required, if thoroughly valuable instruction is to be given in this portion of the course. The funds of the Geological Department of the Museum are, as it appears, hardly more than sufficient, however, for the payment of the salary of the Professor. During the past year, the Corporation of Harvard College has paid one thousand dollars towards the expense of bookcases for the geological library; and the sum of one hundred and forty-two dollars and fifty-two cents has been received from the Sturgis-Hooper fund, in addition to the salary of the Professor. This latter sum was applied to the payment of the expense of fitting up the lecture-room with black-boards, chairs, tables, and other necessary furniture. All the other expenses of the department have been paid by the Sturgis-Hooper Professor; including the cost of lithographing and printing the illustrations of Vol. VI. Part 2 of the Memoirs, and the amount paid Mr. Lesquereux for the preparation of the text.

## REPORT OF N. S. SHALER, PROFESSOR OF PALÆONTOLOGY.

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THE work in the department under my charge has been as follows, viz.:—

Instruction in general geology has been given to two classes, containing in all seventy undergraduates and four graduate students, during the academic year. Their work consisted in attendance on lectures three times a week, and field-work upon the geological problems of this vicinity. In the field-work I have had the assistance of Mr. M. E. Wadsworth; who replaced my assistant, Mr. E. M. Davis, during his absence on an extended journey.

In the department of Palæontology, fourteen undergraduate and three graduate students received instruction. Their work consisted in attendance on lectures thrice a week, and work upon the students' collections throughout the year. In their laboratory work, great use has been made of the synthetic collection of the Museum; the students having been required to familiarize themselves with all the forms represented there.

The summer instruction in geology was given by me, with the aid of my assistant in the summer school, Mr. J. S. Diller, and also by my assistants of the Kentucky Survey, Messrs. J. R. Procter, C. J. Norwood, and L. H. De Fries. Professor Theodore B. Comstock, of Cornell University, also rendered the school great service as an instructor. The teaching was carried on during the months of June, July, and August, in connection with the survey of a transit line, and a detailed geological section between Columbus, Kentucky, and Abingdon, Virginia. Nine persons attended the instruction of the school,—as great a number as could well be provided for in a school working in this fashion.

During the present academic year (1878–79), certain important changes will be introduced in these departments. The

course in Palæontology is no longer open to undergraduates, except in cases where they have received a complete preparation for it. The course itself now extends over two years, — the first year including systematic Palæontology; the second, Historical Geology. A post-graduate course in advanced field-work has also been added to the scheme of studies; the object being to train students in the methods of making geological surveys. The summer school will also be divided into a two-years term; the first year for beginners, the second year for persons of some training. The first or elementary course will be taught during the next summer in Cambridge, and in the Catskill region of New York; the second-year or advanced course will be taught, in connection with the work of the Kentucky Geological Survey, in Eastern Kentucky and the neighboring States. Mr. Davis will have immediate charge of the first-named course; the other will be under my own supervision.

A considerable part of the time of the instructors in these departments has been given to the maintenance of the efficiency of the Harvard Natural History Society, which is now a valuable aid to the schemes of instruction given at this Museum. This society has provided fortnightly meetings devoted to subjects connected with general Natural History, and also a section with meetings once a week, devoted to Geology and Palæontology. The society also maintains a system of prizes, to be given to students in high-schools and academies, for work done on designated scientific subjects. It furthermore supplies a course of popular lectures on scientific subjects, open to the public of this vicinity. Eight lectures were given in this course during the past year, with an average attendance of one thousand persons.



## REPORT ON THE MAMMALS AND BIRDS.

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By J. A. ALLEN.

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IN the departments of mammalogy and ornithology the additions made since the last Report have been unusually important. There have been added to the collection of mammals three hundred and eighty skins, representing about one hundred and fifty species; two hundred and seventy-five skulls (about one hundred and seventy species); and one hundred and fifty skeletons (one-third of them mounted), representing nearly an equal number of species. The collection of birds has been increased by the addition of twelve hundred skins, representing about four hundred species; one hundred and forty-five skeletons (about one-fourth of them mounted); thirty mounted skulls; fifty-four sterna, and twenty other parts of skeletons, mounted separately; nine hundred and thirty-six eggs, and one hundred and ninety-five nests, altogether representing not less than one hundred and forty species. The accessions in both these departments represent mainly species not previously contained in the Museum, and were selected generally with special reference to filling important deficiencies. By far the larger part are the gift of Mr. Agassiz. Several invoices have been received from the Rev. M. M. Carleton, of Umballa, India, in the vicinity of which locality they were collected. These, added to Mr. Carleton's previous shipments, represent very fully the mammalian and avian faunæ of Northern India. Dr. T. M. Brewer, of Boston, has also contributed many nests and eggs of European and American birds, most of the latter being those of rare species. The oölogical department has been further enriched through the purchase of several considerable lots of eggs and nests collected in Colorado, California, and other parts of the West, embracing a large number of rarities.

From the National Museum at Washington has been received a collection of about fifty skins and a small lot of skulls of *Sciuridae*, embracing about twenty species and varieties, chiefly from Mexican and Central American localities; also, a considerable series of skulls of North American *Carnivora*. About ninety skins of mammals have been added through exchanges with the Boston Society of Natural History. Also, by exchange, a skeleton of an African Ostrich; a skull, an entire skeleton, and an embryo of the Dugong; several eggs of the Emeu, and of the Bush Turkey; and two eggs and a bower of one of the Australian Bower Birds (*Chlamydodera nuchalis*). Captain Charles Bryant has presented several embryos of the Northern Sea-Lion (*Eumetopias stelleri*).

A large part of the skeletons sent last year to Professor H. A. Ward, of Rochester, for preparation have been returned; some of them mounted, but the greater number as disarticulated skeletons. A considerable number of mammal and bird skins have been mounted from specimens previously in the collection.

The work on the collections has consisted in the identification and cataloguing of the additions, the marking of the osteological material recently added, and the re-marking of that returned by Mr. Ward. Among the noteworthy changes in the condition of the collection is the substitution of tight, glazed cases for the reception of the glass-stored alcoholic collections in the cellar, and the osteological collections in the attic, in place of open shelves. The systematic collection of mounted specimens has been rearranged, and a new room, devoted to the North American fauna, has been opened to the public. A collection illustrative of the South American fauna has been begun, material for which is rapidly accumulating.

Several small lots of mammals and birds have been sent out as exchanges; and others loaned for study, chiefly to Mr. Robert Ridgway and Dr. Elliott Coues of Washington. The *Rodentia* in the collection have been of great use to the writer in the preparation of monographs (published under the auspices of the General Government, in the Reports of the United States Geological and Geographical Survey of the Territories) of several families of the American representatives of this order.

## REPORT ON THE DEPARTMENT OF REPTILES AND BATRACHIANS.

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By S. W. GARMAN.

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THE collections in this department have maintained a very gratifying rate of growth since the time of the last report. A large and most important collection of skins, skeletons, and alcoholic specimens was secured by purchase in London. Through the kindness of our friends, Rev. M. M. Carleton (India), Revs. B. G. Snow, and A. A. Sturgis (Micronesia), Richard M. Kemp (Florida Keys), Mrs. C. N. Willard (Florida), Professor John T. Humphreys (Georgia and North Carolina), Dr. G. E. Manigault (South Carolina), Dr. Edward Palmer (Arizona), Professor Joseph L. Barfoot (Utah), Miss Mary H. Hinckley, Mrs. J. B. Burnham, Mr. N. Vickary, and Russell Hooper, Esq. (Massachusetts), Dr. R. M. W. Gibbs (Michigan), and others, the Museum has received valuable contributions from their various localities. To Count Emil Kornis (for Montenegrin species), the Musée Civique of Lyons (Syrian and Cochin-Chinese), and the Turin Museum (Italian), it is much indebted for well-selected and carefully preserved donations and exchanges. The collections made in Northern New York, Kentucky (with the Kentucky Geological Survey, under Professor N. S. Shaler), and in Cuba and Southern Florida (with the Blake Expedition of the United States Coast Survey), furnished quite an extended list of species, and many duplicates especially desirable for exchanges with foreign correspondents.

The most bulky additions were the large turtles purchased or prepared by Professor Ward. The portion of my time which has been spent on this department has been devoted to the care of the material, its study and identification, and in preparing it for the rooms open to the public, or for exchange.



It is found that, by mounting the majority of the Sauria and Batrachia on plaster tablets, in the jars of alcohol, their value for purposes of exhibition is greatly enhanced. This takes considerable labor; but, once mounted, they will need no further attention for a long period. Many specimens have been sent to correspondents of the Museum. Every request for duplicates has been complied with. Yet the bulk of what has gone out has been much exceeded by that of the arrivals.

The space allotted to Reptiles and Batrachia in the Systematic Exhibition Room, as well as that in the North American representation, has been occupied.

The upright storage cases which have been erected for the alcoholic collections have prevented the sudden changes of temperature, and the frequent breakages done to them.

The checks upon evaporation introduced by the use of these cases, of copper cans, and of a preparation of wax for the stoppers of the jars, have so cut it down that its amount is very small indeed compared with what it was formerly.

The instances in which the cans suffer by corrosion are few, and the expense on this account will prove a mere trifle in comparison with the amount saved in the prevention of evaporation, and of breakage in glassware, by their use. This applies as well to the alcoholic material in other departments. Alcohol, which has been reduced by the addition of water to 75 per cent or lower, requires changing so much sooner than if left full strength that it is in reality more expensive. There is also in its use an increased danger of decay in the specimens, while cans containing specimens perfectly preserved in strong alcohol are the least likely to be corroded.

The incidental correspondence—requests for information, identifications, &c.—is increasing. A careful attention to all questions has resulted in increasing the interest and activity of our correspondents, from which the Museum of course receives direct benefit.

## REPORT ON INSECTS.

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By DR. H. A. HAGEN.

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1877. Additions to the collection, from —

Mr. C. E. Webster, Binghamton, N. Y. Biological specimens.

Mr. Charles T. Minot. Odonata, and a large lot of other insects, from New England.

Professor Asa Gray. Living Caterpillar of *Cossus* from Bur-Oak, from Ohio.

Mr. H. W. Edwards, Coalburgh, W. Va. Biological specimens for Lepidoptera.

Mr. R. Thaxter, Newton. Lepidoptera, some very rare Noctuidæ.

Rev. A. A. Sturgis, Insects from Ascension Island, Pacific Ocean.

Baron von Osten-Sacken. A very extensive collection of Californian Diptera and Neuroptera.

Professor C. H. Fernald, Orono, Me. A lot of living *Pteronarcys regalis*.

Mr. R. H. Lee, Philadelphia. A Wasp's Nest.

Mr. A. Osgood, Newburyport, Mass. Living Caterpillar of *Bomb. Velleda*.

Mr. H. L. Higginson. A full series of stages of the Rocky Mountain Grasshopper, from Nebraska.

Mr. T. V. Chambers, Covington, Ky. A large lot of United States *Tineina*.

Mr. Theodore Lyman. Several insects.

Mr. L. F. Pourtalès. Living *Eriosoma*.

Mr. P. R. Uhler, Baltimore, Md. A series of United States *Saldidæ*.

Mrs. C. N. Willard, Camp Barrancas, Fla. A lot of insects.

Professor C. Semper. Galls from California: biological and mimical specimens.

Mr. S. H. Scudder. Biological specimens.

Miss C. Clarke. Biological specimens.

In exchange, from —

Mr. J. H. Morrison. United States Lepidoptera.

Professor C. H. Fernald, Orono, Me. United States Lepidoptera : some very rare.

Mr. B. Neumoegen, New York. *Argynnis nitocris*, from Arizona.

Mr. C. A. Dohrn, Stettin. A rich lot of Buprestidæ and Cave Beetles, Neuroptera, a lot of Lamellicornia, Erotylidæ.

Mr. R. Anker, Buda-Pesth, Hungary. European Lepidoptera.

Professor G. Mayr, Vienna, Austria. Dipterous and Hemipterous Galls.

Mr. H. Strecker, Reading, Pa. Cocoons of *Lamia Gloveri*, from Arizona.

Bought from —

Mr. J. H. Morrison. A large lot of Neuroptera, from Georgia and North Carolina.

Professor H. Loew, Guben, Germany. His typical collection of United States Diptera.

1878. From —

Mr. H. G. Hubbard, Detroit, Mich. A very large collection of biological specimens of Termites and other insects, from Jamaica.

Mr. G. Horn, Philadelphia, Pa. Living larva of *Amblycheila* and other larvæ.

Mr. A. Agassiz. Insects from Key West and Havana; Cave Myriapods, from Matanzas.

Mr. R. Morrow, Halifax, N. S. Larvæ of *Cestrus Tarandi*.

Mr. E. H. Burr. Living *Scolopendra*, from Borneo.

Mr. R. Thaxter, Newton. Neuroptera.

Mr. W. H. Edwards, Coalburgh, W. Va. A valuable collection of biological specimens of Lepidoptera.

Mr. F. Sanborn. Neuroptera, from Massachusetts.

Mr. S. Henshaw. Biological specimens of *Amblycheila*, both sexes.

Mr. W. T. Brigham. *Ornithomyia*, from Kanai, Hawaii Island.

Dr. H. A. Hagen. Biological specimens and insects.

The collections of Diptera from Loew and Osten-Sacken are doubtless the most prominent additions. Some large collections have been sent in exchange : to the Museum in Tokio, Japan, a full set of Lepidoptera, covering all families, seven hundred species, in eleven hundred specimens. Of Coleoptera, several larger sets have been sent to Dr. Dohrn : of Lepidoptera, to Dr. Staudinger, Dresden ; Mr. Anker, Buda-Pesth ; Mr. Strecker, Reading, Pa.



Scientific publications, based more or less on parts of the collection, are the monographs of Osten-Sacken of the Tabanidæ, of the western Diptera of the United States, and the new edition of his catalogue of the Diptera of the United States. Mr. R. McLachlan, London, has used for his admirable monograph of the Trichoptera of the European Fauna the types of the collection. Several authors in Europe have described and published a number of South American and Himalayan Beetles ; and Mr. Fauvel, Caen, the United States Staphylinidæ.

A paper on the remarkable genus *Pteronarcys*, containing biological and anatomical details, and several others, are published by the assistant, besides scientific work done for other entomologists: the identification of the Neuroptera from Quebec, Canada, for Abbé Provancher ; the family of Gomphina, for Baron Sélys Longchamps, &c.

Miss M. Clark has given as usual her untiring help to keep the collection free of pests, and to spread and label insects.

The work done by the assistant consists in the systematical collection of an entirely new arrangement of the Lepidoptera of the United States, and of several larger families of Coleoptera. The most important work done relates to the biological collection. In this the Coleoptera are finished ; occupying thirty-nine boxes, about eight hundred species, more or less illustrated, and covering all families. Some parts are rather prominent, from the number of typical specimens. The Diptera are also finished, filling fourteen boxes. Of the Hemiptera and Hymenoptera, several parts are arranged. The collection of Galls, on account of the numerous additions, had to be rearranged, and is now completed. The Parasites, animal and vegetable, are finished. As we are promised very valuable additions among the Lepidoptera, the arrangement of this order was not continued. A general collection has been placed on exhibition in the Synoptic Room.

The great care taken to obtain a thoroughly safe insect cabinet has undoubtedly led many entomologists to deposit their collections permanently in the Museum. The conviction that collections are safely cared for here has induced Osten-Sacken to present his collection, Dr. Le Conte to bequeath his collection, Mr. Chambers to present a collection of Tineina, as well as other entomologists who have promised their collections to the Museum.

## REPORT ON THE ICHTHYOLOGICAL DEPARTMENT.

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By F. W. PUTNAM.

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SINCE the last Report, the work of arranging the specimens, already in jars, has steadily progressed, and I can now state that the alcoholic portion of the collection is disposed of in the basement of the building as follows:—

Eighteen hundred and fifty-four trays have been placed in the two hundred cases, built for the purpose, in the three basement rooms. Each of these trays (with a few exceptions) contains representatives of a single genus, the name of which, with that of the family to which it is referred, is given on the tray. These are placed, as nearly as possible, in systematic order, so that all the specimens of any genus are now readily accessible.

In addition to the thousands of jars that have been arranged in the trays, there are about fifteen hundred which have accumulated during the year, principally by the separation of mixed lots in large jars and the unpacking of several of the copper cans. These jars will be placed in their proper trays when the next step toward the final arrangement of the collection is taken. There still remain between eighty and ninety copper cans and two large tanks, the contents of which are at present unknown to me.

The following additions have been received since the last Report:—

From Mr. R. Brooks, a specimen of *Prionotus* from Rockport, Mass.

From Count Kornis, two specimens of *Cobitis* from Hungary.

From Mr. John T. Humphreys, a young *Petromyzon* from Georgia.

From Miss C. M. Clapp, of the Mt. Holyoke Seminary, a living young *Petromyzon* caught in the Connecticut River, in November, 1876.

From Rev. M. M. Carleton, two species, four specimens, from Umballa, North India.

From Mr. E. M. Nelson, a specimen of *Sternotremia isolepis* Nelson, = *Aphrodederus Saganus*, from the Calumet River, near Chicago, Ill.

From Rev. A. A. Sturgis, about one hundred specimens, of several species, from Ascension Island, Pacific Ocean.

From Rev. B. G. Snow, a second collection of over two hundred specimens, of various species, from Ebon Island, Pacific Ocean.

From Mr. Samuel Powel, one specimen each of *Acipenser* and *Elacate* from Newport, R. I.

By exchange with the Museum of Lyons, a collection of fifty specimens, comprising twenty-six named species of fishes from Syria, Cochinchina, and Switzerland.

From the Smithsonian Institution, a collection of one hundred and eleven species, named, from various localities in North America.

From Prof. G. Brown Goode, several specimens of a new species of *Fundulus* from Bermuda.

From Mr. B. F. Goss, many specimens of young *Amia* from Pewaukee, Wis.

From Mr. J. Henry Blake, a young specimen of *Dactylopterus* and a *Polunys* from Provincetown, Mass.

From Mrs. C. N. Willard, of Fort Barrancas, two small lots of specimens from Camp Barrancas and Pensacola, Florida.

From Colonel R. H. Beddome, of Somerset, Queensland, Australia, a collection of fourteen species from Queensland.

From Captain Charles Bryant, of Fair Haven, Mass., three species from Unalashka.

From Captain Vinal N. Edwards, of Wood's Hole, Mass., eight specimens of the common Eel from the Market at New Bedford, December 31st. These are all females, with eggs in various stages of development though none are mature. They are all of the variety known as "silver-bellies." (Qy. Are the "golden bellies" males?)

From Colonel Theodore Lyman, of Boston, the dorsal fin of a young Brook Trout, showing the repair of a cut fin and one year's growth.

From Mr. S. W. Garman, of the Museum, a small collection from Black Lake, St. Lawrence County, New York, made in May. This collection contains twenty-four pairs of *Lepidostei* taken at the time of spawning.

From Mr. A. Agassiz, several specimens of young fishes from Newport, R. I., and a collection, consisting of about thirty lots, from various places in the Gulf of Mexico, obtained during the Gulf Stream and Gulf of Mexico Exploration in the United States Coast Survey steamer "Blake," 1877-78.

During the year, a few specimens have been sent from the Museum by special request.

The *Selachians* have remained in the charge of Mr. Garman, as stated in the last Report.



## REPORT ON THE CRUSTACEA.

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By WALTER FAXON.

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THE principal additions to the Crustacea since the last Report consist of a large collection made by the Rev. B. G. Snow at the Marshall Islands, and by the Rev. A. A. Sturgis at Ascension Island; a lot of forty-three Norwegian species (all identified) from the Bergen Museum; the dredgings of the United States Coast Survey steamer "Blake" in the Gulf Stream (now in the hands of M. Alphonse Milne Edwards, Paris); a collection from Professor Lovén; and Cladocera from Wisconsin, determined by Mr. E. A. Birge.

During the winter of 1876-77, I determined and catalogued the large collection of the Cancroids of the Museum, and set apart a series of dry Crustacea to illustrate the fauna of North America.

During the academic year 1877-78, most of my time has been devoted, as Instructor in Zöology, to the students in that department. Little has been done with the collection of Crustacea, beyond the care necessary for its safe-keeping.

List of accessions to the collection of Crustacea:—

- Agassiz, A. Larvæ from Newport, R. I.  
 Beddome, C. E. *Matuta*, *Squilla*, from Queensland.  
 Bergen Museum. Forty-three species from Norway.  
 Birge, E. A. Sixteen species of Cladocera from Madison, Wis. (In exchange.)  
 Faxon, Walter. Crustacea, including eggs and larvæ, from Wood's Hole, Mass.  
 Fernald, C. H. *Cambarus Bartonii* from Houlton, Me.  
 Garman, S. W. Specimens from San Francisco, Cal., and Cambridge, Mass.  
 Greenleaf, R. W. Live *Branchipus* from Milton, Mass.

- Humphreys, J. T. *Cambari* from North Carolina.
- Lintner, J. A. *Gammarus fasciatus* from Albany, N. Y.
- Lovén, Professor S. Crustacea from Northern Europe.
- Lyons Museum. *Limulus Moluccanus* from Cochin-China.
- Manigault, Dr. G. E. *Cambarus* from Charleston, S. C.
- Mansfield, J. F. A collection of fossil *Merostomata* from Cannelton, Pa. (Purchased.)
- Pacific Mail S. S. Co. *Lepas* from Pacific Ocean, through Lieutenant Day, U. S. N.
- Packard, A. S., Jr. Types of *Lepidurus Couesii* Pack. and *Estheria Clarkii* Pack. North-Western Boundary Survey. (In exchange.)
- Powel, Samuel. Live *Branchipus* from Newport, R. I.
- Semper, Carl. Specimens from Europe and Philippine Islands.
- United States Coast Survey steamer "Blake." A. Agassiz's collection of dredgings in the Gulf of Mexico.
- Willard, Mrs. C. N. Crustacea from Florida.
- Wood, Rev. R. W. Thirty-four species, one hundred and twenty-four specimens, from the Marshall Islands, collected by the Rev. B. G. Snow. Thirty-four species, ninety-seven specimens, from Ascension Island, collected by the Rev. A. A. Sturgis.

## REPORT ON THE CONCHOLOGICAL DEPARTMENT.

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By CHARLES E. HAMLIN.

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FROM November, 1876, the work of identifying and revising species of marine Lamellibranchiata, in which I was then engaged, was carried forward through the winter and early spring, — all time not given to instruction being so employed.

In May, labor upon the collection of Fossils, now stored in the attic, was taken up where it was left when interrupted by the cold of winter. The Palæozoic Mollusca were arranged in the order of their geological age and by classes, distributed into their respective families and genera, and were placed in the glazed cases provided for their reception. The fossil Fishes, Articulates, and Radiates were arranged in accordance with their geological succession.

Part of two days in each week of the academic year 1876–77 was given by me to instructing a college class in Structural Geology and Physical Geography.

In consequence of the death of Mr. Anthony, it becomes my duty to report upon that part of the work of which he had more immediate charge. As during the four years previous, his special attention was given to the Land and Fresh-water Mollusca, and the conducting of exchanges with numerous correspondents. His records show that from Nov. 23, 1876, to Sept. 1, 1877, there were received eleven packages, containing, besides much material for other departments, two thousand four hundred and forty-five specimens of shells, representing one hundred and twenty-five species.

The number of packages forwarded to different persons and institutions, during the same time, was sixteen, including one thousand six hundred and fourteen species, and five thousand five hundred and fifty-six specimens. The larger consignments were made to Dr. Henry Dohrn of Stettin, Prussia; C. E. Bed-



dome of Somerset, Queensland ; Mrs. Charles Coxen, Bulimba, Queensland ; Count Emil Kornis of Buda-Pesth, Hungary ; W. Legrand of Hobart Town, Tasmania ; and L. G. Yates of Centreville, Cal.

The conchological work for the year ending Sept. 1, 1878, has been unusually miscellaneous in character, as a consequence of the changes that have been in progress throughout the Museum.

During the fall, the alcoholic mollusks were arranged in the cases provided for them in the basement, by families and genera, so far as the original lots have been divided up. From the palæontological collections now stored in the attic, a large number of Palæozoic and Mesozoic Mollusks were selected, to be hereafter divided between the Systematic Collection and that which will be formed to illustrate the various geological formations. This work was continued so long as it could be carried on in rooms not furnished with heating apparatus.

Since the beginning of winter, there have been accomplished :

1. The systematic arrangement of the great mass of duplicate Land and Fresh-water Shells. They are now for the first time readily accessible for use in exchange or study.

2. An examination of some large but disorderly collections of miscellaneous shells, followed by a proper distribution of the valuable material and the rejection of the worthless.

3. The overhauling of several foreign local collections of great value, which had become mingled and confused, their separation according to locality, and such arrangement as was essential for ready access.

4. Final arrangement of the dry Mollusks of the Synoptic Collection, and preparation of diagnoses of the larger molluscan groups.

5. The naming of three collections of shells sent by educational institutions for determination.

6. Care of collections of shells received in exchange ; and the selection and labelling of lots sent in return.

7. Selection of specimens of shells for the North American Faunal Collection. About two-thirds the number required have been made ready, and have received preliminary arrangement in the exhibition cases.

8. Provisional arrangement (pending the construction of new cases for the Systematic Collection of Mollusca) of mounted Land Shells in the glazed cases of the attic ; the overhauling of the large accumulations of shells of Unionidæ (duplicates), the rejection of the greater part, and the storing of the rest in the attic cases.

9. Communication with the numerous correspondents of the late Mr. Anthony with reference to future exchanges.

Miss Anthony, as in years past, has had charge of mounting shells for exhibition, and has rendered valuable service by cleaning specimens and securing them from dust.

The transactions in exchange have been as follows:—

Ten packages of shells have been received, containing four thousand four hundred and ninety-three (4493) specimens of five hundred and seventy-three (573) species. Three packages have been sent to as many persons, containing two thousand one hundred and twenty-five (2125) specimens, illustrating seven hundred and twenty (720) species.

## REPORT ON RADIATA AND PROTOZOA.

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By L. F. POURTALES, Keeper of the Museum.

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THE most important additions to the collections in this department made for many years are those resulting from the dredgings made by Mr. Agassiz in the Gulf of Mexico. These, added to what the Museum had before, make it the depositary of probably one of the richest deep-sea collections in existence. The Gulf of Mexico and the West Indian seas prove to be one of the richest regions thus far explored for deep-water forms.

The arrangement of these and the description of the new forms is progressing favorably, the Echini, Ophiuridæ, and Corals having been nearly completed by Messrs. Agassiz, Lyman, and myself. The Star Fishes are in the hands of Professor Perrier of Paris, the Sponges are with Professor Oscar Schmidt, and the Foraminifera with Mr. H. B. Brady. The Alcyonarians of former dredging expeditions, which had been for a number of years in the hands of Professor Kölliker of Würzburg, will be returned, as he has found it impossible to work them up, on account of the pressure of other occupations.

In the exhibition room devoted to Radiates, the collections had to be removed temporarily, for the purpose of having the exhibition cases painted. They have been replaced lately, and the collection of Sponges added. The room will be completed when the systematic collections of Crinoids, Alcyonarians, and Protozoa are arranged.

The collection of Ophiuridæ has been, as heretofore, under the charge of Mr. T. Lyman, who has been assisted by Miss E. H. Clark.



## REPORT ON THE LIBRARY.

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 By MISS F. M. SLACK.
 

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DURING the year ending Oct. 1, 1877, there were added to the Library 424 volumes, 864 parts, and 244 pamphlets; and, during the months following up to Sept. 1, 1878, 316 volumes, 478 parts, and 116 pamphlets. Of these, there were received from —

	VOLUMES.	PARTS.	PAMPHLETS.	TOTAL.
Donations and Purchase . . . . .	622	982	242	1845
Foreign Societies, Exchanges . . . . .	92	256	20	368
American Societies . . . . .	14	81	12	107
Library of Louis Agassiz . . . . .	3	14	86	103
Museum of Comparative Zoölogy . . . . .	9	9	0	18
	<hr/>	<hr/>	<hr/>	<hr/>
	740	1342	360	2442

[A.]

[House No. 4.]

## COMMONWEALTH OF MASSACHUSETTS.

HOUSE OF REPRESENTATIVES, Jan. 12, 1877.

The Committee on the Judiciary, to whom was referred the petition of the Trustees of the Museum of Comparative Zoölogy for the dissolution of said Corporation, have had the same under consideration, and report the accompanying Bill.

For the Committee,

EMORY WASHBURN.

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 AN ACT

TO DISSOLVE THE CORPORATION OF THE TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY.

*Be it enacted by the Senate and House of Representatives, in General Court assembled, and by the authority of the same, as follows:—*

The Corporation of the Trustees of the Museum of Comparative Zoölogy, created by chapter two hundred and eight of the acts of the year eighteen hundred and fifty-nine, is hereby dissolved, subject to the provisions of sections thirty-six and thirty-seven of chapter sixty-eight of the General Statutes.

[B.]

## INVESTED FUNDS OF THE MUSEUM

IN THE HANDS OF THE TREASURER OF HARVARD COLLEGE, SEPT. 1, 1877.

Sturgis-Hooper Fund, . . . . .	\$70,142.52
Gray                   ,, . . . . .	51,750.00
Agassiz Memorial ,, . . . . .	{ 297,933.10
Teachers & Pupils' Fund, . . . . .	
Permanent               ,, . . . . .	117,469.34
Humboldt               ,, . . . . .	7,740.66
Agassiz Building       ,, . . . . .	8,345.26
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	\$560,944.89



[C.]

## FACULTY OF THE MUSEUM.

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CHARLES W. ELIOT, *President.*

ALEXANDER AGASSIZ, *Curator.*

JOHN B. S. JACKSON.

JOSIAH D. WHITNEY, *Secretary.*

THEODORE LYMAN.

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OFFICERS.

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ALEXANDER AGASSIZ, . . . . . *Curator.*  
 JOSIAH D. WHITNEY, . . . . . *Sturgis-Hooper Professor of Geology.*  
 HERMANN A. HAGEN, . . . . . *Professor of Entomology.*  
 NATHANIEL S. SHALER, . . . . . *Professor of Palæontology.*  
 WILLIAM JAMES, . . . . . *Assist. Prof. of Physiol. and Comp. Anat.*  
 L. F. POURTALES, . . . . . *Keeper.*  
 THEODORE LYMAN, . . . . . *Assistant in Zoölogy.*  
 CHARLES E. HAMLIN, . . . . . *Assistant in Conchology and Palæontology.*  
 JOEL ASAPH ALLEN, . . . . . *Assistant in Ornithology.*  
 F. W. PUTNAM, . . . . . *Assistant in Ichthyology.*  
 WALTER FAXON, . . . . . *Assistant in Zoölogical Laboratory.*  
 W. M. DAVIS, JR., . . . . . *Assistant in Geological Laboratory.*  
 S. W. GARMAN, . . . . . *In charge of Reptiles.*  
 E. L. MARK, . . . . . *Assistant in Zoölogical Laboratory.*  
 M. E. WADSWORTH, . . . . . *Assistant in Lithology.*  
 PAULUS ROETTER, . . . . . *Artist.*  
 MISS F. M. SLACK. . . . . *Librarian.*



